2021 HSC Automotive Vehicle Body Marking Guidelines

Section I

Multiple-choice Answer Key

Question	Answer
1	C
2	A
3	C
4	A
5	D
6	B
7	C
8	D
9	A
10	D
11	C
12	D
13	C
14	B
15	B

Section II

Question 16

Criteria	Marks
• Provides a detailed description of how an automotive workshop can promote environmental sustainability • Uses correct industry terminology	4
• Provides some description of how an automotive workshop can promote environmental sustainability • Uses some industry terminology	3
• Outlines how an automotive workshop can promote environmental sustainability	2
• Provides some relevant information	1

Sample answer:

Workshops can promote sustainability by scheduling regular staff meetings where staff are reminded of how they can be more environmentally responsible.

Answers could include:

- To reduce amounts of packaging/or reduce amount of transport required, items can be purchased in bulk
- Separating recyclables into different categories such as metal and paper
- Installing more energy efficient equipment such as LED lighting
- Ensuring all waste equipment is operating correctly such as oil separators.

Question 17 (a)

Criteria	Marks
• Describes TWO types of fire which would be extinguished by the fire extinguisher	2
• Identifies ONE type of fire which would be extinguished by the fire extinguisher	1

Sample answer:

- Paper or wood fire
- Flammable liquids such as petrol
- Electrical fires.

Question 17 (b)

Criteria	Marks
• Provides a clear outline of the procedure to extinguish a fire using a fire extinguisher	3
• Provides a basic outline of the procedure to extinguish a fire using a fire extinguisher	2
• Provides some relevant information	1

Sample answer:

Pull the pin at the top of the extinguisher to release the handle, aim the nozzle towards the base of the fire, squeeze the handle to discharge the extinguishing material and sweep the nozzle backwards and forwards at the base of the fire until the fire is extinguished.

Question 18 (a)

Criteria	Marks
• Provides a sound response using industry terminology	2
• Provides some general information	1

Sample answer:

It is important for a technician to initially experience the symptoms. This will allow the technician to more accurately identify the fault in the area and system to be diagnosed.

Question 18 (b)

Criteria	Marks
• Clearly describes the difference between a symptom and a fault • Uses an example to clearly demonstrate the difference between a symptom and a fault • Uses correct industry terminology	4
• Describes the difference between a symptom and a fault • Uses an example to demonstrate the difference between a symptom and a fault • Uses some industry terminology	3
• Uses basic terminology to describe the differences between a symptom and a fault	2
• Provides some relevant information to distinguish between a symptom and a fault	1

Sample answer:

A symptom is what is experienced when driving a car. A fault is what is causing the problem.

Example: A customer explains that a car is vibrating and noisy under braking. The problem needs to be isolated to an actual fault in the braking system. This could be a faulty brake disc. The brake disc is the fault, the symptom is the vibration under braking.

Question 19 (a)

Criteria	Marks
• Lists TWO WHS risks using industry terminology	2
• States ONE WHS risk using industry terminology	1

Sample answer:

- Manual handling injury due to weight of lifting door. Injury could be sustained by repairer.
- Pinch point injury to limbs or fingers which could become trapped or crushed during refitting procedures.

Question 19 (b)

Criteria	Marks
• Clearly explains reasons for sequencing of refitting procedure • Uses correct industry technology	3
• Provides some reasons for sequencing of refitting procedure • Uses industry technology	2
• Provides some relevant information on sequencing or refitting	1

Sample answer:

As the rear quarter panel is fixed, is welded into position and cannot move, it has no provision for adjustment. It is therefore best practice to start re-assembly at the rear door of the vehicle, as this is the fixed panel portion of the vehicle and will allow for correct panel position and alignment.

Question 20 (a)

Criteria	Marks
• Clearly outlines the process using industry terminology	2
• Provides some relevant information	1

Sample answer:

Thoroughly clean panel using wax and grease remover. Apply wax and grease remover with either spray bottle or rag and remove with a separate clean rag or lint free wipe prior to evaporation. This ensures that all contaminants are removed and don’t remain on the surface of the area to be refinished causing adhesion and other concerns.

Question 20 (b)

Criteria	Marks
• Provides a detailed description of the steps to be followed in preparation for top coat • Uses correct industry technology	4
• Clearly describes the steps to be followed in preparation for top coat • Uses industry technology	3
• Describes some steps to be followed in preparation for top coat • Uses some industry technology	2
• Provides some relevant information about some steps required	1

Sample answer:

Place vehicle in a suitable area, clean panel with wax and grease remover to remove surface contaminants, apply guide coat to aid in correct sanding of the surface. Wet sanding method would include the selection of correct abrasive.

To achieve the best outcome a wet sanding block would be necessary.

Answers could include:

Dry sanding method – select the correct abrasive, connect sander to vacuum system, continually move sander over panel while undertaking sanding operations until all guide coat is removed from panel. Use compressed air to clean panel and repeat cleaning of panel using wax and grease remover.

Question 21 (a)

Criteria	Marks
• Clearly outlines the difference between AC and DC	2
• Provides some relevant information that distinguishes between AC and DC	1

Sample answer:

Alternating current is electrical energy that travels in both directions over a period of time. The positive and negative constantly change.

Direct current only travels in one direction and always has the same positive and negative over a period of time.

Question 21 (b)

Criteria	Marks
• Explains the effects of voltage drop on a circuit • Uses industry terminology	3
• Provides an outline of the effects of voltage drop on a circuit • Uses some industry terminology	2
• Provides some relevant information on voltage drop	1

Sample answer:

This voltage drop could cause wiring to heat up and possibly burn.
Items such as headlights would be dull and could be dangerous.
Damage to components such as starter motors is possible.

Answers could include:

Effects of greater than 0.6 volt of voltage drop could cause devices being powered to underperform or not work at all.
Electronic components could malfunction.

Question 21 (c)

Criteria	Marks
• Provides a detailed explanation of the differences between a series and parallel circuit • Uses industry terminology	4
• Provides a sound explanation of the differences between a series and parallel circuit • Uses some industry terminology	3
• Provides a basic explanation of the differences between a series and parallel circuit • Uses basic industry terminology	2
• Provides some relevant information	1

Sample answer:

A series circuit only allows electricity to travel down one path. If any part of the circuit is broken electricity will not flow. An example is a brake lamp switch in a brake lamp circuit.
A parallel circuit is one where electricity can have two or multiple paths. If one path is not operating this will not prevent the other paths from operating. An example is a headlight circuit. If one headlamp is not operational this will not affect the other one.

Voltage drops in a series circuit will equal the supply voltage.

Voltage drops in a parallel circuit is equal across the combined load.

Answers could include:

A diagram of a series and a parallel circuit.

Section III

Question 22 (a)

Criteria	Marks
• Provides a detailed explanation of the use of both an etch primer and a primer filler • Uses correct industry terminology	5
• Provides an explanation of the use of both an etch primer and a primer filler • Uses industry terminology	4
• Provides a sound explanation of the use of both an etch primer and a primer filler • Uses some industry terminology	3
• Provides a description of the use of both an etch primer and a primer filler • Uses basic industry terminology	2
• Provides some relevant information	1

Sample answer:

Etch primers:

- Are used where adhesion to a bare metal surface (substrate) is important.
- Are usually applied in one to two coats and film build of material is low.
- Have good rust inhibiter qualities and are also known as acid based/wash primers.

Primer fillers:

- Have high film build and are used for priming previously repaired body filler surfaces.
- Have good filling properties when high build is required to cover imperfections prior to top coat colour.
- Have good sealing properties for suspect surfaces to avoid solvent sensitivity (frying/wrinkling).

Question 22 (b)

Criteria	Marks
• Provides a comprehensive description of types of drying equipment and their uses • Uses correct industry terminology	9–10
• Provides a thorough description of types of drying equipment and their uses • Uses industry terminology	7–8
• Provides a sound description of types of drying equipment and their uses • Uses some industry terminology	5–6
• Provides a basic description of types of drying equipment and their uses • Uses basic industry terminology	3–4
• Provides some relevant information about drying equipment and its uses	1–2

Answers could include:

Preparing a vehicle for the use of paint drying equipment requires the vehicle to be placed in a suitable area. Specific equipment requirements include:

Ultraviolet light drying equipment

Equipment should be checked for faults and correct operation prior to use.
Test and tag date to be verified.

Safe operating procedure (SOP) to be understood prior to use.

Appropriate personal protective equipment such as UV suitable protective eyewear and work wear.

Position light source the correct distance (approximately 10–20 cm) away from UV primer previously applied to surface.

Area to be dried (cured) should be no larger than a standard A4 size sheet of paper.

Drying time and application of light to be calculated based on product being used and should be for approx. 2–4 minutes in length. This will ensure correct curing and longevity of the equipment.

Infrared drying equipment

Equipment should be checked for faults and correct operation prior to use.

Test and tag date to be verified.

Safe operating procedure (SOP) to be understood prior to use.

Appropriate personal protective equipment such as safety wear and work wear.

Position light source the correct distance (approximately 50–100 cm) away from the area to be dried.

Infrared drying equipment can be used to dry all modern paint and filler surfaces except acrylic lacquer type paints, which can suffer damage if infrared heat source is applied.

Area to be dried (cured) should be no larger than a standard A4 size sheet of paper.
Drying time and application of infrared light to be calculated based on product data sheet for the product being used and can range from 1–12 minutes in length. This will ensure correct curing and longevity of the equipment.

Infrared light timer is to be set to product data sheet recommended flash time and secondary timer set to full cure time from 1–12 minutes in length.

Spray booth (combination booth) drying

Spray booth equipment should be checked for faults and correct operation prior to use.
Up to date service records should be verified prior to use.

Safe operating procedure (SOP) to be understood prior to use.

Appropriate personal protective equipment and work wear to be worn.

Once paint spraying application has completed, baking temperature on booth is to be set as per product data sheet requirements.

Spray booth operational timer is to be set as per product data sheet requirements.
Booth will automatically commence cool down cycle once drying cycle is completed.

A visual inspection of paint surface and drying effectiveness to be carried out prior to removing vehicle from booth.

Section IV

Question 23

Criteria	Marks
• Provides a comprehensive evaluation of how global events can affect the automotive industry from a local and global perspective • Provides clear links to how the challenges of global events can be addressed • Provides a logical and cohesive response • Uses industry specific terminology	13–15
• Provides a thorough evaluation of how global events can affect the automotive industry from a local and global perspective • Provides links to how the challenges of global events can be addressed • Provides a logical and cohesive response • Uses industry specific terminology	10–12
• Provides a sound evaluation of how global events can affect the automotive industry from a local and global perspective • Provides links to how the challenges of global events can be addressed • Provides a logical and cohesive response • Uses industry terminology	7–9
• Provides some evaluation of how global events can affect the automotive industry from a local and global perspective • Provides some basic links to how the challenges of global events can be addressed • Provides a logical and cohesive response • Uses some industry specific terminology	4–6
• Provides general information on how global events can affect the automotive industry	1–3

Sample answer:

How the automotive industry can be affected by global events.

The automotive industry has been significantly affected by COVID-19 by reducing the capability of manufacturers to staff factories during mandatory shut down periods. Staff have also become sick or passed away further reducing the manufacture of vehicle and parts. This situation caused significant delays in the supply chain which compounded the problem. Even though demand in the downturn diminished, new vehicle production levels have not been able to keep up with this reduced demand. This has caused prices to rise worldwide for both new and used vehicles. Transmissible diseases in air and on hard surfaces required new processes to be developed to ensure that all aspects of the supply chain were safe. This commenced with factories having to implement reduced workforces due to social distancing requirements and separating workforces to A and B to limit the possibility of transmission taking the whole factory workforce out of the production process. Companies had to invest in sanitary equipment based on risk to ensure even limited production occurred. The supply chain has had to implement processes such as cleaning vehicles on departure and arrival, following strict guidelines that could be easily monitored if transmission occurred. Transportation employees such as truck drivers need to isolate in different states and at borders in other countries. This adds further delays to the supply and delivery of vehicles.

Training worldwide has been impacted as the small number of trainers with specific abilities (such as electric and hydrogen) previously travelled worldwide to deliver vehicle specific training. This has not been able to occur due to state border closures or countries being closed.

How the automotive industry can be affected locally

The issue for Australia is that it has limited manufacturing capability. Recent global events have highlighted significant issues for Australia because of this. New models previously scheduled for release have needed to be moved back, some as much as a year (eg Subaru Outback). Manufacturers and dealerships typically have provided incentives to buyers however in the current economic environment where demand is greater than supply no discounts are being offered. Second-hand vehicle prices have also risen as new vehicles have become scarce. An unexpected result of recent global events is the increase in prices of collectable vehicles. As people have not been able to work or holiday they have been investing in hobbies such as car restoration. This again has caused a supply and demand price increase. Training for students such as Tvet and apprentices has needed to be delivered online. This has disadvantaged trade students who need theory to complement practical instruction. This has caused training to be much less effective and added significant time to their training and experience. This will impact the quality of tradespeople in the future. When students and workers in the industry are working on cars strict processes must be followed such as car sanitisation, mask wearing and social distancing. This affects all aspects of the automotive industry from service and repair to training, delivery and purchase. Automotive parts have become harder to source and therefore some vehicles have not been able to be placed back into service as some parts are not able to be procured for months.

In conclusion recent global events have affected many areas of the automotive industry, added significant cost to the manufacture and supply chain for manufacturers and also the general public as costs have increased.

2021 HSC Automotive Vehicle Body Mapping Grid

Section I

Question	Marks	HSC content – focus area
1	1	Mandatory — troubleshooting and problem solving – troubleshooting processes – page 36
2	1	Stream — vehicle body – use and maintain tools and equipment in an automotive workplace – tools and equipment – page 60
3	1	Mandatory — safety – work health and safety (WHS) – page 27
4	1	Mandatory — troubleshooting and problem solving – troubleshooting processes – page 36
5	1	Mandatory — sustainability – environmentally sustainable work practices – page 34
6	1	Mandatory — working in the automotive industry and workplace – employment – page 41
7	1	Stream — vehicle body – use and maintain tools and equipment in an automotive workplace – tools and equipment – page 59
8	1	Stream — vehicle body – apply knowledge of automotive electrical circuits and wiring systems – electrical fundamentals – page 57
9	1	Stream — vehicle body – remove and store vehicle body components – dismantling and removing components – page 61
10	1	Stream — vehicle body – remove and store vehicle body components – dismantling and removing components – page 61
11	1	Stream — vehicle body – remove and store vehicle body components – dismantling and removing components – page 61
12	1	Stream — vehicle body – apply refinishing primers to vehicle surfaces – application of primers – page 63
13	1	Stream — vehicle body – apply refinishing primers to vehicle surfaces – cleaning components – page 61
14	1	Stream — vehicle body – apply refinishing primers to vehicle surfaces – cleaning components – page 61
15	1	Stream — vehicle body – apply knowledge of automotive electrical circuits and wiring systems – electrical fundamentals – page 57

Section II

Question	Marks	HSC content – focus area
16	4	Mandatory — sustainability – environmentally sustainable work practices – page 34
17 (a)	2	Mandatory — safety – incidents, accidents and emergencies – page 30
17 (b)	3	Mandatory — safety – incidents, accidents and emergencies – page 30
18 (a)	2	Mandatory — troubleshooting and problem solving – terminology – page 36
18 (b)	4	Mandatory — troubleshooting and problem solving – terminology – page 36
19 (a)	2	Stream — vehicle body – applying refinishing primers to vehicle surfaces – work tasks – pre repair body operations and paint repairs preparation – page 60
19 (b)	3	Stream — vehicle body – remove and store vehicle body components – dismantling and removing body components – page 61

20 (a)	2	Stream — vehicle body – apply refinishing primers to vehicle surfaces – surface preparation for paint repairs – application of primers – pages 62–63
20 (b)	4	Stream — vehicle body – apply refinishing primers to vehicle surfaces – application of primers – page 62
21 (a)	2	Stream — electrical – electrical fundamentals – alternating current (AC) and direct current (DC) – page 57
21 (b)	3	Stream — electrical – electrical fundamentals – relationship between voltage and current from measured values – page 57
21 (c)	4	Stream — electrical – electrical fundamentals – characteristics of series and parallel – page 57

Section III

Question	Marks	HSC content – focus area
22 (a)	5	Stream — vehicle body – apply refinishing primers to vehicle surfaces – application of primers – page 63
22 (b)	10	Stream — vehicle body – apply refinishing primers to vehicle surfaces – refinishing primed surfaces – page 63

Section IV

Question	Marks	HSC content – focus area
23	15	Mandatory — risk management; incidents, accidents and emergencies – pages 29–30 Mandatory — working in the automotive industry and workplace – nature of the industry – current issues and trends affecting the automotive industry and implications for an automotive workplace – page 40